13. NGDLC Features and Functions

"We also invite manufacturers of NGDLC systems and other 'next generation' equipment to describe the features, functions, and capabilities of their products, and to indicate whether their products are designed with open or proprietary interfaces." [59]

Alcatel provided system descriptions for its access network equipment above and in attached **Exhibits,** which include descriptions of our Litespan® NGDLC systems.

These systems have both open and proprietary interfaces. The open interfaces include those supporting derived services and facilities at the CO and RTs. The proprietary interfaces are internal system interfaces. They include interfaces supported with the integrated SONET transport modules, inter-shelf cabling, individual shelves, slots and line cards, as well as the system software and element management system access.

14. Subloop Transmission Capacity

"We invite comment on manufacturers' plans to build NGDLC systems and other equipment to maximize the transmission capacity of the subloop."

As noted above, Alcatel currently makes NGDLC equipment with OC-3 and OC-12 transport capacities. There are presently no plans to expand this capacity in the existing systems. However, there are other options for adding transport capacity at remote collocation sites, some of which are noted in the *FNPRM*. These include the use of separate transport facilities, such as paralleling fiber optics and/or wireless equipment, as well as increasing the capacity of the existing fiber external to the remote systems. Options for the latter, include inserting Litespan®-2012 systems or higher speed SONET ADMs to sub-tend the existing NGDLC system and new collocation equipment. Another option is to insert WDM on the existing fiber feed.[60] A third option would use a combination of WDM and ADMs to serve the existing and new equipment. The options may vary significantly in cost in individual cases. In addition, their feasibility depends on available space and enclosure configurations.

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[59] *Ibid.*

[60] As noted in response to the first question, dual-wavelength WDM is currently an option for adding an OC-3c interface at a Litespan®-2000 RT to carry ATM traffic (reserving the existing OC-3 capacity for TDM).

15. Remote Terminal Access

"[I]s it technically feasible for carriers to access the subloop by interconnecting at the remote terminal?"[61]

It is not possible to provide external access to the internal NGDLC components or software, either at CO or at RT locations. The internal components include (but are not limited to) the integrated transport facilities, system controller and channel bank shelves and individual facility and service line cards. The inaccessible software includes the system software as well as direct access to the EMS. The derived services and facilities supported by these systems are accessible, however, as are the copper facilities extending beyond RTs.

Viable options exist for accessing the copper facilities extending beyond RTs. As we have noted elsewhere,[62] the *Line Sharing Order* discussed the use of RTs as accessibility points where they have feeder distribution interfaces ("FDIs"). However, the availability of such interfaces was not included as a condition for such treatment in the actual orders (*see* Appendix C of that document).

The addition of FDIs at RT sites in CSA arrangements, where there would be SAIs in tandem, would jeopardize service reliability with additional activity points that are known sources of failure. In addition, such interfaces would have to terminate all of the pairs extending away from the site, the derived pairs hardwired to the system shelves and the pairs in the initial and future collocation cables. Such interfaces, if they could be developed, would be enormous and would not likely fit in existing (or even conceived) enclosures. Electronic alternatives would be cost prohibitive. Further, it would not be possible to retrofit existing sites with such interfaces without disrupting service and there would be no access security. Fortunately, other options make the addition of such interfaces unnecessary.

In both the *Line Sharing Order* and the *Local Competition Third Reconsideration Order*[63] the Commission includes FDIs and other accessible terminals as options for interconnection. To the extent such terminals exist, and are accessible, there is no need for RT sites to be modified

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61 FNPRM at ¶ 133

62 CC Docket No. 98-141 – Ownership of Plugs/Cards and OCDs

63 Paragraph 218. Note that it refers to "any accessible terminal," not "all" or "every." This suggests that accessibility options at other locations should legitimately be considered before modifications at any one particular location, such as a remote terminal, could be considered "necessary" to gain access to subloop elements.

for additional accessibility or capacity. An example of a widely used location is the "main BT" at major office and multi-dwelling residential buildings. Although there are significant issues with the use of this space, BT closets often have more space available and options for expansion than RTs (especially cabinets) and FDIs. They also have controlled environments, power supplies, and direct access to the building wiring. This makes them preferable in several aspects to RT collocation.[64]

Since distribution pairs terminate directly on FDIs/SAIs, similar to inside wiring at BTs, they would seem to be the next most favorable point of interconnection. Although FDIs/SAIs were not designed for electronic equipment additions,[65] they are ideal points of interconnection in cases where CLECs can install their own NGDLC or DSLAM equipment in adjacent cabinets. Cables can be placed to new terminal blocks (if there is space) or spliced to spare binder groups that are (or can be) connected to unused terminal blocks. Even if an FDI/SAI cabinet has to be enlarged to accommodate more terminal blocks, such a modification that may be preferable to expanding or otherwise modifying RT enclosures.

Alcatel has become aware that some CLECs are concerned that FDI/SAI sites may not have nearby power or fiber facilities. Those cases further support the approach of placing the equipment in separate enclosures, where such access is available, and extending copper feeder cables to the FDI/SAI locations.

However, there can be significant service differentiation advantages for CLECs in placing the remote NGDLC or DSLAM terminals as close as possible to the SAIs, especially when the incumbent LEC's RT is located significantly closer to the CO. With adjacent FDI/SAI installations, higher bandwidth lines such as VDSL[66] can be delivered to most, if not all, of the customers within the associated distribution area. In contrast, less than one-third might be reached from the CSA's remote terminal site.[67]

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[64] As do other vendors, Alcatel has cabinets that are specifically designed for building terminal applications.

[65] They lack essential electronic enclosure design requirements for thermal dissipation and EMI as well as necessary components such as power feeds, rectifiers, batteries and protectors.

[66] VDSL ("Very high-speed Digital Subscribe Line") can support downstream data rates up to approximately 52 Mbps over 1,000 feet and 26 Mbps over 3,000 feet on copper. The latter fits most DA designs in suburban areas, while the former fits most DA designs in high-density urban areas. Although VDSL standards are still evolving, and demand is in its infancy, it is clear such lines can support a wider variety of voice, video and data services.

[67] As noted earlier, CSAs are normally designed to serve two to four distribution areas. They serve customers on loops up to 9 Kft on 26 gauge copper and 12 Kft on 24 and coarser gauge copper, including bridged tap, from the

Where BT and FDI options are not available, other options may exist at a RT site that preclude the need for major equipment or enclosure modifications. As the Commission declares in the *FNPRM* (*see* Footnote 272), one such proposal is access through "engineering controlled splices." With this option, cables from the CLEC's DSLAM or NGDLC equipment could be spliced directly to spare cable binder groups in the RT's derived feeder cables.

There is another option that can be employed on a limited basis. Alcatel supplies connector kits with its mini-RAMs that allow individual ADSL lines to be connected directly into the fuse slots of RT protector terminals. The connectors include splitters, so the high frequency ADSL lines can be separated from the POTS lines served by the DLC system. Since these are individual jumpers and not cables, however, they create the risk of non-standard wiring arrangements. This, in turn, could reduce service reliability and restrict access to other equipment.[68] Further, there are no access security options for the protectors.

Still, with the small size of the mini-RAMs themselves, this option is ideal for low demand applications. Of note are rural areas with traditional DLC systems that cannot be upgraded with ADSL.[69] Although "packet equipment" has generally been excluded from the unbundling rules, and may be further restricted under merger terms and conditions, Alcatel feels consideration should be given to allowing ILECs to install these systems. The incumbents could share the derived facilities on a non-discriminatory basis with CLECs (and advanced services affiliates).

IV. Conclusion

Achieving the promise of full competition necessitates open and fair collocation requirements. All service providers must be given non-discriminatory access to ILEC facilities so that they can offer their intended service.

In the *FNPRM* and in related proceedings, the Commission is carefully navigating among various competing interests in its efforts to fulfill Congress' collocation mandate. As these

RT. With this "hub" design, it is unlikely that all of the customers in even the closest DA would be within VDSL reach at the 26 or 52 Mbps rates.

[68] Although we are not aware of formal guidelines for the use of these connectors, we understand that 8 -16 lines can normally be connected without significant obstruction or service concerns. Careful consideration should be given to the long-term effects of connecting more lines in this fashion.

efforts move forward, the Commission always has been mindful of how important equipment manufacturers are to this process and it has consequently acted with their best interest in mind.

This strong commitment to equipment manufacturers must continue as decisions are made on the issues raised in the *FNPRM*. Of utmost importance is the need for the Commission to establish a "bright line" demarcation between open network interface standards, which are subject to Section 251(c)(6) of the Act, and proprietary network interface standards, which are not subject to such mandated interoperability requirements. Alcatel, herein, has provided the Commission with sufficient information to make this critical distinction.

Proprietary interface standards for line cards must be protected fully. Collocation of an outside party's line cards is not feasible. The DSLAMs and NGDLCs vital to collocation are software controlled and line cards are integral components of these systems. Only manufacturer-supplied or manufacturer-authorized line cards can be installed, supported by system hardware, and properly serviced. However, access to line cards certainly can be provided to standard service and network interfaces. Making line cards subject to collocation would retard manufacturer R&D efforts significantly because there would be no incentive to develop and then protect this technology.

Imposing such safeguards on line cards would not preclude competitive carriers from exploiting collocation fully. Numerous interface options are available. Thus, the public interest obligates the Commission to rule that line cards and related embedded system components are not subject to collocation requirements.

The Commission also wisely solicited information on current and proposed network platforms designed to facilitate collocation. Alcatel, as detailed herein, clearly leads the way in providing the equipment and support to make full collocation a reality.

Alcatel's multiplexing equipment, which includes SONET ADMs and digital and optical cross connect systems, as well as DSLAMs and NGDLCs, is both efficient and necessary for collocation to flourish.

[69] As with other DSLAMs, this application still requires case-by-case reviews of space, power and thermal and EMI limits. In addition, security and accessibility issues suggest limiting installation and operation to the DLC owners.

Installation of advanced service capabilities in NGDLC systems would expand the deployment of those services through the shared use of the systems. Other options exist for unsupported services while market driven enhancements to the cards, systems and software progress.

In addition, Alcatel has several sizes of RT systems and cabinets, as well as cabinets designed for adjacent installations. With these products, myriad options are available for accessing subloop facilities at and beyond NGDLC remote terminal sites. These options moot the need to modify or expand RT sites or to place additional requirements or restrictions on the shared use of derived services, moot the need for other, unavailable options, such as access to internal system components, including line cards.

The Commission clearly is proceeding in the right direction. Fully competitive collocation certainly would be possible with the equipment Alcatel and other manufacturers are developing, with the sensitivity to carrier needs displayed by ILECs and CLECs alike, and with adoption of the limitations on interface requirements set forth herein.

Respectfully submitted,

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Certificate of Service

This is to certify that one (1) original and four (4) true and accurate copies of the foregoing was hand delivered this 12 day of October 2000 to the Office of the Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 445 Twelfth Street, SW, Room TW-B204, Washington, DC 20554 and to the following parties:

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Exhibit 1 -- Alcatel 1603 SMX Features

Key features of the Alcatel 1603 SMX system include the following:

- STS-1 level bandwidth management across the entire OC-48
- Payload using DS1 Grooming and drop capability
- Temperature Hardened Optics (-40+65C) for deployment flexibility
- Advanced architecture for reliability and network optimization
- Ethernet drops (up to 16 ports)
- Compact footprint and reduced power usage
- T-Mux (M13 in a card) feature -- provides DS-3 to VT-mapped STS-1 payload conversion
- Simplified network management and FTP software download functions
- Easy in-service, in-shelf upgrades from OC-3 to OC-12 to OC-48 to OC-192
- Alcatel 1301 Network Element Manager and 1320 Network Manager Support

Interfaces supported by the 1603 SMX include:

- DS1 (112)
- DS3/STS-1 (48)
- OC-3 (16), STS-3c
- OC-12 (4), STS-12c
- OC-48
- 10/100 BaseT
- T-Mux

The SMX can operate in various modes and configurations, including:

- Terminal
- Linear ADM
- 2-fiber Unidirectional Switched Path Switched Ring (USPR)
- 2-fiber Bi-directional Line Switched Ring (BLSR)
- Optical Hub

Exhibit 2 -- Alcatel ASAM 7300 Features

Key features of the Alcatel ASAM 7300 are as follows:

System capacity

- Up to 432 lines per 7 ft. rack with splitters
- Up to 648 lines per 7 ft. rack without splitters
- Up to 2,592 DSL lines per network interface
- Up to 5,000 DSL lines per network interface through subtending
- Average power consumption: 1.6 watts per ADSL line
- NEBS level 3 compliant per rack

ATM Network interface cards

- OC-12 (622 MB)
- OC-3 (155 MB)
- DS-3 (45 MB)
- 4 x DS1 IMA (4 x 2 MB)
- Up to 96 MB on-board memory
- Optional 1 + 1 redundancy (APS / EPS)

Line interface cards

- ADSL - Multi-standard auto-detect ADSL
  - ITU G.dmt, ITU G.Lite, ANSI TI.413
  - 12 lines per board
- ANSI HDSL-2, 8 lines per board
- ITU G.shdsl, 12 lines per board
- Passive splitter types: T1E1.413 Issue 2 compliant

ATM service characteristics

- Supported ATM QoS classes
  - UBR, UBR+
  - CBR
  - rt/nrt-VBR
  - GFR

Exhibit 2 (Cont'd) -- Alcatel ASAM 7300 Features

- Multi-QoS per line
- Up to 12,000 connections (PVC / SVC) per system
- Up to 16 connections (VCs) per line

Central office equipment

- 30.5 in. (18U) high x 21.5 in. wide x 12 in. deep
- Up to 12 shelves on a single network interface

Remote equipment

- Dual level multiplexing architecture via remote ASAMs
- Connection to host via 4 x DS1 IMA
- 48-line and 216-line shelves, temperature hardened
- 8-line mini-RAM for 23 in. racks

Exhibit 3 -- Litespan®-2000 & -2102 Features

Key features of the Litespan®-2000 are as follows:

- Highly reliable architecture with fully redundant protection schemes
- SONET OC-3 optical digital loop carrier
- Ring, multiple remote, point-to-point, stand-alone, and dual feeder configurations
- Compliance with TR-057, TR-008, and GR-303 switch interfaces
- Copper and fiber-to-the-curb solutions using the Starspan® and ENU platforms
- Full suite of narrowband special services
- WDM support
- Maintenance cost reduction
- High density footprint
- NEBS compliant
- SONET add/drop for distributed bandwidth
- 7-layer OSI stack for SONET data communications channel interoperability
- GUI interface for element management
- Temperature hardened
- Asynchronous/byte-synchronous HDSL
- TCP/IP or X.25 interfaces for remote operations, administration, maintenance, and provisioning ("OAM&P")
- Integrated DMT or CAP ADSL
- ADSL DMT chipset same as Alcatel's ASAM
- G.Lite support for ADSL DMT (future)

The Litespan®-2012 system has the above features along with the following:

- SONET OC-12 digital loop carrier
- SONET OC-3, OC-3c, STS-1 (future), and DS3 facility interfaces
- Utilizes 85% of existing widely deployed Litespan® common control
- Utilizes same channel bank assembly and channel units as Litespan®-2000
- STS-1 drop and continue ring support

- Overlapping virtual ring support with OC-3 for transporting ATM and TDM traffic back to the central office (eliminating the need for WDM)

Schedule NR-2

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matters of	)	
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147
	)	
and	)	
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98

REPLY COMMENTS OF ALCATEL USA, INC.

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November 14, 2000

EXECUTIVE SUMMARY

A strong, unequivocal message has been sent in comments filed concerning the above captioned proceeding. Classifying plug-in line cards as unbundled network elements ("UNEs") would disrupt network operations, stifle product development, decrease competitive opportunities, and violate statutory collocation requirements and related public policy. Simply put, treating line cards as UNEs would be totally contrary to the public interest.

As a leading manufacturer of line cards and other equipment essential to universal deployment of Internet and other emerging broadband technologies, Alcatel USA, Inc. ("Alcatel") is well-positioned to detail the impact that such a decision could have on network operations and product development. In these Reply Comments, Alcatel shows why such fears are justified and must be considered as the Commission develops its policies for promoting local loop competition.

The unrebutted record of evidence in this proceeding demonstrates that making line cards subject to mandated interoperability requirements risks the following:

- **Disruption of network operations** – Installation of line cards manufactured by multiple vendors threatens network integrity, especially in the Next Generation Digital Line Carrier ("NGDLC") systems that will constitute the platform for growth of competitive local services. Variations in system technical specifications cannot be accommodated if cards with varying characteristics are introduced by a competitive local exchange carrier ("CLEC") into a central office ("CO"), remote terminal ("RT") or building terminal ("BT") operated by an incumbent local exchange carrier ("ILEC"). Furthermore, if a third party's line card causes system failure, service would be disrupted and necessary repairs would be delayed. System security would be compromised because different operators' line cards would be vulnerable to dislocation or disconnection when adjacent facilities are installed, tested or repaired. Unnecessary costs would be incurred by ILECs to administer and monitor the multiple line cards used. System warranties would be voided if non-authorized line cards are introduced.
- **Product development would be stifled and competitive opportunities would be reduced** – Required access to line cards embedded in an ILEC's CO or RT usurps the associated proprietary rights held by the manufacturers of such cards. Without the ongoing protection afforded by these rights, research and development investment would be reduced significantly or eliminated completely. Future

growth of advanced services and development of competitive local loop technologies would be stunted.

- **Statutory policy will be undermined** – Under Section 251(c)(6) of the Communications Act of 1934, as amended (the "Act"), ILECs have a statutory duty to provide collocation necessary for CLECs to interconnect with UNEs. However, CLECs do not need the right to use their own line cards or to access software controlling the ILEC's line cards for collocation to be realized on a universal, non-discriminatory basis. Instead, open network interfaces should be mandated at an ILEC's CO, RT or BT facilities. Indeed, feasible options exist that allow CLEC access or interconnection to the derived services (or virtual facilities) supported by NGDLC systems.

Arguments made by CLECs and others in this proceeding, that line cards must be classified as UNEs, are unavailing and unsubstantiated. Most telling is the absolute lack of any documented evidence supporting these claims. Rather, these proponents of making line cards subject to collocation requirements merely take on the role of "Chicken Little," decrying the lack of equal access to ILEC facilities.

Absent any proof that collocation access would be denied if line cards remain classified as non-UNEs, these allegations must be rejected. The record of this proceeding clearly shows that CLECs would not be disadvantaged because a full menu of collocation options exists that do not require making line cards UNEs. Based upon this unrefuted evidence, the Commission is compelled to stay the course by ruling that line cards are not subject to collocation requirements.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matters of	)	
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147
	)	
and	)	
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98

REPLY COMMENTS

I. Introduction

Pursuant to Section 1.415 of the Commission's Rules,[1] Alcatel USA, Inc. ("Alcatel") hereby replies to certain of the comments submitted in response to the *Second Further Notice of Proposed Rulemaking* in the above-captioned proceedings.[2] In this proceeding, the Commission raised several issues relevant to ensuring that competitive local exchange carriers ("competitive LEC" or "CLEC") have full, non-discriminatory rights to collocate in the incumbent local exchange carrier's ("incumbent LEC" or "ILEC") central office ("CO"), remote terminal ("RT"), or building terminal ("BT").

One of these issues involves whether a plug-in line card should be classified as an unbundled network element ("UNE") subject to such collocation requirements. As demonstrated herein, classifying a line card as a UNE would not be in the public interest. Network operations would be disrupted. Product development would be stifled. Local service competition would be decreased.

Alcatel is well-qualified to assist the Commission in addressing this collocation issue. It is the world's leading supplier of xDSL equipment. With this cutting edge

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[1] 47 C.F.R. § 1.415.

[2] *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Dkt. No. 98-147, Second Further Notice of Proposed Rulemaking, FCC 00-297 (rel. August 10, 2000). A list of parties, whose comments are addressed herein, is set forth in Appendix A.

product line. Alcatel supports the advanced service equipment needs of ILECs, CLECs, and consumers.

In its comments, Alcatel described the optical and electrical multiplexing equipment it supplies for collocation in the ILEC's CO, RT and BT.[3] Alcatel also described its Litespan® "next generation" digital loop carrier ("NGDLC") equipment widely used by incumbent LECs for loop feeder deployment and by CLECs for collocation and network overlay deployment.[4] While these systems have proprietary software and hardware components, they also support standards-based network, facility and service interfaces.[5]

In particular, Alcatel detailed the use of foreign or non-authorized line cards (or "plug-ins") in Litespan® systems.[6] It described the full array of technical and operational problems caused by installation of line cards not manufactured or licensed by Alcatel in its systems.

Furthermore, as is the case with other internal system components, it is not possible to directly access or interconnect with these line cards. Access is only possible through the derived (or "virtual") facilities and service lines supported by the systems. Given these critical system characteristics, neither physical nor virtual line card collocation is possible. Therefore, a line card should not be treated as a separate UNE subject to full collocation obligations.

In its comments, Alcatel further explained the advantages of installing software components and hardware components, such as line cards, that support advanced services

[3] Alcatel at 4-7, 12-13.

[4] Alcatel at 7-11.

[5] Narrowband service interfaces include POTS, COIN, FXS, PBX and ISDN-BRI. Wideband interfaces include T1, DS1 and HDSL. Broadband service and facility interfaces (Litespan®-2012 only) include DS-3, OC-3 and OC-3c. ATM broadband service interfaces (both Litespan®-2000 and -2012) include ANSI standard DMT ADSL. Future service (or "drop" or "facility") interfaces include HDSL2 (initially TDM and later ATM-based), G.lite and G.shdsl. Network interfaces include VF (for non-integrated narrowband access), DS1, OC-3 and, for the ATM traffic, OC-3c.

[6] Alcatel at 16-17.

in Litespan® and other NGDLC systems used by ILECs.[7] In addition to delivering higher speed data transmission services to customers beyond the reach of CO-based systems, such installations allow multiple service providers to cost effectively share a common network infrastructure. With the use of Optical Concentration Devices ("OCDs") and other common network interfaces, CLECs may access advanced service facilities in a non-discriminatory fashion, ensuring service features and quality at least as good as the ILEC provides for itself. These software and hardware component installations do not impede CO or remote access to parallel loop facilities and do not impede the deployment of separate equipment that may be required for non-standard interfaces.

Finally, Alcatel commented on options for interconnection and access at other points of the network, which eliminate the need for line card collocation or even major reconstruction of RT housings.[8] These options include BT locations commonly used for DSLAM and Integrated Access Platform ("IAP") deployments to support proprietary Symmetric Digital Subscriber Line ("SDSL") and other commercial customer offerings. Access is also available at FDIs[9] and RTs, using adjacent enclosures and connecting cables where there is either inadequate space in the existing housing or the housing was not designed for loop electronics.

Despite this overwhelming evidence that line cards should not be classified as UNEs, various commenters nonetheless attempt to convince the Commission that access to line cards is critical to their business plans. Several parties argue that they need the ability to install their own line cards in NGDLC systems.[10] Some parties also claim that the use of NGDLC systems, particularly Alcatel's Litespan®, hampers competition because advanced service features were developed without regard to their own particular

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[7] Alcatel at 10-13.

[8] Alcatel at 19-21.

[9] The terms "FDI" ("Feeder Distribution Interface") and "SAI" ("Serving Area Interface") are used interchangeably. Alcatel at 7 note 6.

[10] See e.g., Rhythms at 18-24; Network Access at 17-19; WorldCom at 13; Connectiv at 28-29; @Link at 4; DSLNet at 8-15; Mpower at 43-48.

requirements.[11] Other parties argue that they need access to proprietary information regarding the systems in order to develop their business cases and deployment plans.[12]

These arguments have no merit. Line card collocation is neither feasible nor necessary. Most importantly, none of these commenters offer any objective or empirical evidence to support their claims. Moreover, classifying line cards as UNEs is inappropriate because NGDLC features are rationally developed in light of market requirements for standard interfaces, not individual specifications, and the use of standard interfaces preclude the need to access proprietary information.

II. NGDLC Line Card Collocation Not Feasible

The record of this proceeding contains substantial evidence supporting Alcatel's position that line cards are not UNEs subject to collocation. Verizon specifies the numerous problems attendant with treating line cards as UNEs:

> [E]ach vendor needs to be able to differentiate its equipment from that of its competitors by offering unique features and functions, rather than allowing one size to fit all. And ... each plug-in line card must be compatible with the overall design of the system with which it is to be used, including the software.
>
> * * * * *
>
> In addition, from a policy perspective, allowing each carrier to provide line cards would make highly inefficient use of the incumbent's equipment and increase costs for both the competitors and the incumbent's own customers. This is because each individual line card in a remote terminal gives access to multiple circuits. If each carrier supplied its own cards, dedicated to its use, multiple circuits in each remote terminal would need to be dedicated to that carrier and would be unavailable for any other customer. It can be expected that many, if not most, carriers would not have use for all of those circuits in every remote terminal to which it connects. The resulting unused capacity would at best significantly reduce efficient use of the network, thereby increasing costs, and at worst strain the available network capacity. By making inefficient use of the equipment that the incumbent has installed in the remote terminal, such an arrangement would allow fewer customers

[11] See e.g., RCN at 14; WorldCom at 9; @Link at 5-6; Mpower at 33-38.

[12] See e.g., Connectiv at 27; @Link at 6-7, DSLNet at 13-15; Mpower at 46.

> to be served, because there will simply be no room in the remote terminal to install additional equipment to serve those customers.
>
> * * * * *
>
> Moreover, attempting to inventory and provision multiple line cards belonging to multiple carriers in each of tens of thousands of remote terminals will create an Operation Support System nightmare. This is because the incumbent would need to find a way to continuously determine which competitor's line cards are in use in each item of equipment in each remote terminal.[13]

Similarly, SBC declares that:

> [i]f carriers obtain unbundled access to ... line cards ... they could prematurely exhaust system capacity. If a CLEC has unbundled access to a line card, the incumbent would lose its ability to manage the network to maximum use of the shared facility. A CLEC with unbundled access to a line card would be able to exhaust prematurely the system's capacity, thus preventing other CLECs from using the service.[14]

Qwest warns that "it would be premature to require line card collocation on a general basis since implementation issues such as equipment interoperability have not been resolved."[15] BellSouth asserts that, if "a CLEC were to insert an incorrect line card, it could render an entire digital loop carrier system inoperative."[16]

Nortel believes that, "unless the line cards are from the same manufacturer or [are] manufactured by third parties under license, it would not be practical for the Commission to mandate that [CLECs] be able to collocate their own line cards" at the ILEC's facility.[17] Since there are no industry standards governing line card interchangeability, Nortel fears that "it would be virtually impossible to use different manufacturers' line cards in a single

---

[13] Verizon at 9-10 (citations omitted). BellSouth fears that "collocation of CLEC line cards in [its] digital loop carrier systems would create tremendous record-keeping, inventory and asset management concerns when some of the inventory is owned by a CLEC." BellSouth at 19.

[14] SBC at 63.

[15] Qwest at 14 (emphasis added).

[16] BellSouth at 19.

[17] Nortel at 4.

[Digital Loop Carrier]" and that "it would be very difficult, if not impossible, to develop industry standards without thereby stifling technological development."[18]

(a) Line card collocation is not technically feasible.

Alcatel has repeatedly noted that the installation of plug-in line cards not manufactured or licensed by the original manufacturer is technically unfeasible.[19] Reasons for lack of feasibility of foreign line card installation include variations in NGDLC system and line card specifications, such as line card and back plane sizes, system powering, and heat dissipation requirements.

Line cards are simply printed circuit boards. These circuit boards consist of components such as chip sets, resistors and solder points. These components, in conjunction with the system software, allow for provisioning certain service features and functions. The line cards themselves are specially designed to fit into slots, which are hard wired to the system back plane. The circuit board, which is the line card, simply cannot be modified without changing and re-designing the board's components.

Any change in board design must be associated with a change in other hardware and software design. For instance, line cards designed for DSLAM back planes cannot be transported "as is" to embedded NGDLC systems. More specifically, a DSLAM line card designed to support 24 lines would not work in an NGDLC slot designed and hardwired for four cable pairs.

In addition, chipsets supporting different service capabilities have different power and thermal dissipation factors. These different factors affect overall system design and capacity, neither of which can be modified in existing systems.

(b) Direct interconnection with NGDLC line cards is not possible.

Alcatel repeatedly has noted that it is not possible to interconnect directly with NGDLC line cards.[20] Instead, access is provided to the derived lines through the standard

[18] Ibid.

[19] See e.g., Alcatel at 19, *ff.* and in the "Open Forum," May 10, 2000.

[20] Alcatel at 16.

service and facility interfaces at the RT[21] and network interfaces in the CO.[22] Circuits are provisioned end-to-end through the NGDLC systems. A NGDLC line card by itself has no service capability.

(c) Line card collocation creates unnecessary security and operational risks.

The NGDLC line card interoperability concept is also flawed because it presents serious security and operational issues. If interoperability is required, line cards from several CLECs could be installed. Allowing multiple CLECs or other operators into the limited space available in RTs increases the potential for inadvertent changes to installed line cards and related equipment. Some of these concerns were addressed in the frequently quoted Illinois commission ruling as reasons why only ILECs should be allowed to install the cards.[23]

(d) Line cards should not be required to support SDSL.

One set of the parties supporting CLEC installation of line cards in NGDLC systems is the "Swidler Group."[24] Apparently, one of the Swidler Group's primary concerns is that line cards used in SBC's *Project Pronto* do not support SDSL.[25]

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[21]Physically, RT service and facility access is provided through the cable pairs that are hardwired to the channel banks. These are normally extended in derived feeder pairs to FDIs and thence, through distribution pairs, to network interface devices at customer premises.

[22]In the case of Litespan®, the TDM network interfaces in the CO include VF pairs terminated on the MDF in UDLC (TR-057) configurations and DS1 facilities that support integrated, TR-008 and GR-303 interfaces. The latter configuration may be terminated at DSX-1 panels or EDCS systems, or they may be directed connected to one or more local digital switches ("LDS"). ATM-based circuits (*e.g.*, ADSL) are directly routed from the RT (or series of RTs) to an OCD or other ATM device through an optical, OC-3c interface.

[23]ICC 00-312 and 00-313, Consolidated, August 17, 2000, Issue 7, Section D, "Commission Analysis and Conclusion."

[24]Companies represented by Swidler Berlin Shereff Friedman, LLP. These companies include Conectiv Communications; Corecomm, Vitts Networks, and Logix, Inc.; CTSI, Waller Creek Communications, Inc. dba Pontio Communications Corp.; DSLNet Communications, LLC; @Link Networks, Inc., Mpower Communications; and the Joint Comments of Telergy, Inc., Aldelphia Business Solutions, Inc., and Business Telecommunications, Inc., all dated October 12, 2000. Excluded from this group reference are the filings from the same firm covering a narrower scope, including those for Fiber Technologies, LLC; Lightbonding.com, Inc. and PF.Net Communications, Inc.

[25]*See* Conectiv at 28.

This concern is totally unjustified. Alcatel repeatedly has explained that SDSL is a proprietary DSL interface that is not supported in infrastructure systems such as NGDLC. A major reason SDSL is not supported in Alcatel's NGDLC equipment is because it is a non-standard technology and as such, it is not expected to achieve any significant market penetration.

A further reason that Alcatel's NGDLC equipment does not support SDSL is that it is predominantly a business service requirement, whereas NGDLC systems principally serve residential customers. There is only limited market opportunity for symmetrical service in the residential customer market. In any event, for that limited market, and for the business service market, Alcatel is planning to include other standardized flavors of symmetric service in the future.[26]

(e) Alternatives to line card collocation are available.

An additional assertion made by certain commenters in support of line card interoperability is that it is too costly to deploy their own DSLAMs at RT locations.[27] These parties cite low service demand as a basis, yet they insist on RT collocation space.

It is quite common for DSLAMs supporting these services to be installed at BTs where the service demand is considerably smaller. This practice suggests there are conflicting views of the business opportunities for such deployment. Further, it might be possible for competitive service providers to share DSLAMs, which would reduce the individual deployment costs in a fashion similar to sharing derived NGDLC facilities.

AT&T went further by concluding that collocation at remote terminals was virtually impossible and economically unfeasible.[28] While space and interconnection limitations at RTs make derived facility sharing attractive, there still are sufficient opportunities for remote collocation to make case-by-case reviews worthwhile.

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[26] Alcatel has pledged to support G.shdsl in Litespan subject the standardization process. Alcatel at 23.

[27] See Network Access at 17 and the Swidler Group filings.

[28] See, e.g., AT&T at 53 and attached Declaration of Joseph P. Riolo at 18.

In addition, adjacent collocation is a viable option where there is inadequate space in an existing RT enclosure. This option provides more flexibility for CLECs which plan to provide services that require shorter loop lengths than found in the typical serving area. IP Communications, in particular, disagrees with this approach, claiming it costs "approximately $500,000 per adjacent collocation."[29] Experience indicates that this estimate may be over-stated by at least ten-fold for remote DSLAM installations.

Rhythms asserted that existing NGDLC systems could support all versions of DSL, whether standard or proprietary.[30] This claim falls into the category of "anything is possible, theoretically." Rhythms, however, fails to take into account practical considerations. Many development constraints preclude inclusion of "everything but the kitchen sink" in terms of NGDLC line card functionality. Not the least of these constraints is the exponential combination of multiple vendor features and functions that would have to be taken into consideration. However, Alcatel will continue to develop line cards and features that meet industry standards for interfaces and protocols. Nearly all the commenters agreed that there were significant advantages in sharing the derived NGDLC facilities that such cards support.

III. NGDLC Development Results from Rational Market Analysis

Alcatel's product development strategy is rationally based on a combination of *market, financial, competitive, regulatory and customer requirement considerations.*[31] Additional features for existing systems are developed based on the issuance of new industry standards, Alcatel's own sense of market conditions, customer estimates of potential demand for the features, and considerations regarding development costs and profit potential.

In contrast, IP Communications and Rhythms claimed that Alcatel developed the Litespan® ADSL capabilities based on the needs of one customer without regard to any

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[29] IP Communications at 7.

[30] *See* Rhythms at 23.

[31] Alcatel at 13-15.

other party.[32] This claim is patently false and wholly unsupported. Alcatel's Litespan® product development was based on ANSI standards and the ATM capabilities that had been designed into the system back plane over a decade earlier by DSC Communications Corporation ("DSC").

Further, Rhythms asserts that Litespan® developers ceased working with other vendors to develop line cards when the product line was acquired by Alcatel, ostensibly to restrict the development to the requirements of that one customer, namely SBC.[33] In fact, DSC did incorporate Alcatel's ADSL technology and chipsets into its ADSL line card design. Again, this development decision was based on (then) recently issued standards and it involved cooperation with the leading supplier of the technology supporting the standard, which is Alcatel. This form of cooperation did not cease with Alcatel's acquisition of DSC. Alcatel, like other NGDLC vendors, continues to enlist the assistance of other vendors in the development of standards-based line card features for Litespan® under licensing agreements.

Despite such assertions, Alcatel continues to solicit, from potential non-customer users of Litespan® systems owned by ILECs, input regarding their needs and requirements. To the extent the functions and features they seek, which are supported by standards, are technically feasible and appear to be commercially viable, Alcatel will consider them for future product development plans.

IV. *Proprietary Information Must Be Protected*

In its comments, Alcatel explained that NGDLC systems and their line cards are controlled by proprietary system and element management software.[34] This is Alcatel's copyright protected intellectual property, licensed under a restrictive licensing agreement to the system owner. Alcatel has invested tens of millions of dollars to develop this

[32] See IP Communications at 14 and Rhythms at 23.

[33] See Rhythms at 23.

[34] Alcatel at 16.

software. It is inherently unfair for parties to suggest that they have access to such software outside of any normal and customary procurement process.

Furthermore, the software is not open to modification by third parties. It would be impossible for Alcatel, or any other party for that matter, to modify the software in a way that could accommodate the differentiated features of all the other proprietary line cards in the market. Interestingly, none of the comments appears to directly address any of these technical issues. The record only seems to reflect unsubstantiated rhetoric designed to scare the Commission into ignoring manufacturers' substantial R&D investments so that CLECs and other carriers can take unfair advantage of the collocation process.

For example, the Swidler Group, among other commenters, contend that "CLECs are disadvantaged in their ability to request advanced capabilities of next generation architectures because ILECs and their vendors have not fully disclosed the capabilities of the equipment they plan to deploy."[35] This claim gets at the heart of the "intellectual property" issue. However, as set forth below, the costs associated with mandating such disclosure far outweigh any purported benefits.

Alcatel, like other vendors, provides proprietary and confidential product documentation related to its customers. These materials are used to support the installation, provisioning and maintenance of Alcatel manufactured equipment. This documentation also supports current and future network planning. All information is provided to Alcatel's customers under non-disclosure agreements ("NDAs") and other instruments that restrict further distribution or disclosure of protected information. Alcatel's customers may not, without its express consent, pass protected information on to non-customers.

It is absolutely essential that proprietary information must remain confidential for competitive reasons. Opening the door to further distribution, even under NDAs, would greatly jeopardize the security of that information.

In addition, any misuse or misinterpretation of this information could be prejudicial to the parties who attempt to use it. For example, development plans for new features and

[35] See Conectiv at 33.

functions are subject to significant change in detail design and scheduling, all of which are covered in direct customer briefings. Actual implementation of equipment enhancements in customer networks depends on customer testing and approval of the features as well as deployment decisions that pertain to their particular network capabilities. Specifically, the inclusion of a feature or capability in a "planning guide," for instance, may not ensure its availability in actual practice.

This problem is exacerbated if a CLEC intends to use functions or features that the ILEC is not currently using or planning to use. In this case, there would be no ILEC test or use experience that could assist CLEC deployment. Furthermore, there could be additional operational and maintenance issues with such use that the proprietary documentation (designed for the direct customer) would not cover.

Another important consideration is that CLECs cannot plan to use specific features and functions of the ILEC systems without regard to the deployment parameters planned for those systems, which are known only to the ILEC. RTs are deployed for specific geographic areas serving a fixed number of customer locations.[36] System and enclosure sizes are designed based on those locations. The use of service features that reduce the delivery capacity of the systems must be carefully monitored and controlled by the system owner to avoid prematurely exhausting the capacity of the system. At risk is the denial of basic service delivery and/or substantial network re-configuration.

An example of this possibility is use of constant bit rate ("CBR").[37] SBC noted that a system supporting 672 ADSL lines with unspecified bit rate ("UBR") would be reduced to approximately 100 with CBR at a 1.5 Mbps service rate.[38] Such reduction in planned capacity would be significant. Likewise, by the very nature of the queuing algorithms, the CBR traffic would restrict the flow of the more popular and widely used UBR traffic. Understanding the implications of the services requires thorough familiarity with the system as well as the documentation.

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[36] Alcatel at 8-9

[37] The CBR, as a service feature and not a facility in itself, also cannot be treated as a UNE.

[38] SBC at 70.

Another danger of non-customer use of proprietary documentation is the tendency to assume that the systems easily can be reconfigured to meet capacity changes. For instance, even Alcatel's public documentation notes that the OC-3c interfaces can be chained to serve up to 32 ATM Bank Control Units ("ABCUs") and that such chains can be split with additional OC-3c links when needed. That may sound simple, but a thorough understanding of Alcatel's upgrade procedures, normally accommodated with hands-on training, is required to know if such upgrades actually would be possible in specific situations.[39]

The point is, regardless of the competitive implications, the more detailed the documentation, the more dangerous it is in the hands of non-users. At the very least, the distribution of such essential information needs to be controlled directly by the equipment supplier which can then work with both the actual customers and indirect users to resolve any issues relating to the interpretation and use of the documentation.

For the foregoing reasons, access to proprietary information is not necessary and, in fact, is counter-productive. Instead, public information on Alcatel's web site is sufficient for preliminary planning considerations. It provides product outlines describing the basic features and functions of the equipment. More detailed planning depends on the actual deployment considerations under control of the customers which purchase the equipment.

V. Miscellaneous Issues

In addition to the critical issue of how line cards should be treated for collocation purposes, other issues were raised that are addressed below:

1. Space Reservation

There were many comments regarding how much space to reserve for collocation and/or reservation periods.[40] Alcatel agrees that equipment design parameters need to be considered in space planning exercises.

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[39] In actual practice, most chains are limited to nine (9) channel banks, since that is the common control limit for acceptable POTS QoS.

[40] See, e.g., AT&T at 71-74; DSLNet at 53-56.

For instance, in Litespan® systems, there is an 80-inch wiring limit from the Common Control Assembly ("CCA") to the last Channel Bank Assembly ("CBA") connected to the CCA, whether in the CO or at a RT location. Where the initial installation does not include the full system capacity, rack space must be reserved for future channel bank installations, regardless of when they may occur.

2. NGDLC Within 16 Kft

Rhythms claims that NGDLC installations (with advance service capabilities) should be prohibited within 16 Kft of the CO to prevent interference between DSL lines originating at the CO and those originating at the RT.[41] This type of prohibition would place an unreasonable economic burden on affected service providers and, in the case of ILECs, would increase basic service costs.

NGDLC systems are normally deployed beyond 12 Kft for economic capacity expansion.[42] Some situations warrant placements even closer to the CO. In addition, including advance services with these installations supports downstream ADSL rates of 1.5 Mbps (or better) with normal line conditions and binder group service mixes. Additionally, Litespan® ADSL cards (ADLUs) have level-setting options that mitigate interference caused by different power sources and levels. In addition, lines serving major business locations often can be groomed to other binder groups to eliminate such interference.[43]

Higher speed DSL lines, like VDSL, require shorter copper distribution paths. Consequently, no limits should be placed on NGDLC or other RT deployments that support advanced services.

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[41] Rhythms at 89.

[42] Alcatel at 22.

[43] Exceptions may arise where CO-based services terminate in buildings that have other lines served by building terminal DSLAMs. It may not be possible to separate the lines in the inside wiring. This problem will exist regardless of NGDLC installations.

3. Cross-connects at Remote Terminals

Several CLEC commenters said they needed cross connections at remote terminals.[44] As Alcatel notes in its comments, NGDLC systems installed in CSA design applications purposely were designed without cross-connect access.[45]

The installation of full cross-connect features would not be feasible due to the size of the panels that would be required to terminate the wiring from the NGDLC and DSLAM systems as well as the derived feeder pairs. Additionally, it would be impossible to install such panels in existing RTs without disrupting service. Cross-connects must be restricted to existing and future FDIs beyond the RTs, using accessibility options such as engineering controlled splices.

4. Access to OSS

Alcatel provides a proprietary element management system ("EMS") to provision and maintain services on its Litespan® and ASAM systems. Currently, this software only can be used by a single owner with licensed rights.

Alcatel is in the process of reviewing market and customer requirements for multiple access to these operational functions. At the very least, such access may allow "read only" surveillance of individual derived lines.[46] Additional network management functions could be enabled if adequate security can be provided and methods can be developed to avoid interruption of other services with maintenance operations such as intrusive testing. It is possible that multiple service provider access could be supported by EMS software partitioning and/or through higher level, network management system access.

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[44] See e.g. IP Communications at 16.

[45] Alcatel at 25-27.

[46] As opposed to the use of virtual RTs with dedicated GR-303 interface groups, which only can carry TDM traffic.

At a minimum, substantial further study of these issues is required. Alcatel defers commitment, with respect to how it will proceed with the issue of OSS access, until those studies are completed.

VI. Conclusion

Alcatel again welcomes the opportunity to participate in this proceeding. As a leading supplier of NGDLC systems with advanced service capabilities, Alcatel has a material interest in its outcome.

While Alcatel fully supports remote collocation and facility sharing, it proves conclusively herein that line card interoperability is not the answer because such an approach is technically unfeasible. Mandated interoperability also is unacceptable because NGDLC feature development is best done in response to market drivers, including industry standards, rather than through regulatory mandates. Furthermore, to ensure continuation of innovative product development and to protect network operations, Alcatel must remain in control of its proprietary and confidential information.

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Focal Communications Corporation ("Focal")
IP Communications Corporation ("IP Communications")
LightBonding.com, Inc. ("LightBonding")
Network Access Solutions Corporation ("Network Access")
Nortel Networks, Inc. ("Nortel")
PF.Net Communications, Inc. ("PF.Net")
Qwest Communications International, Inc. ("Qwest")
RCN Telecom Services, Inc. ("RCN")
Rhythms Netconnections, Inc. ("Rhythms")
SBC Communications Inc. ("SBC")
Telergy, Inc.; Adelphia Business Solutions, Inc.; Business Telecommunications, Inc. ("Telergy")
Verizon Telephone Companies ("Verizon")
WorldCom, Inc. ("WorldCom")

Certificate of Service

This is to certify that one (1) original and four (4) true and accurate copies of the foregoing was hand delivered this 14th day of November, 2000 to the Office of the Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 445 Twelfth Street, SW, Room TW-B204, Washington, DC 20554 and by regular mail to the following parties:

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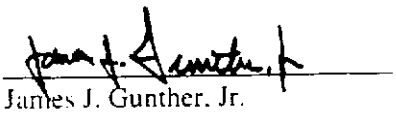
By: 
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